Figure 1 – Hardware Architecture

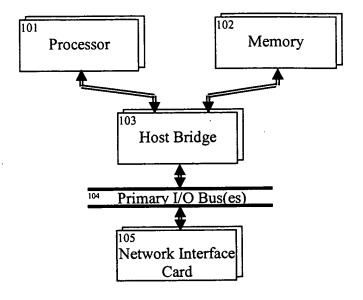


Figure 2 – NIC Hardware Architecture

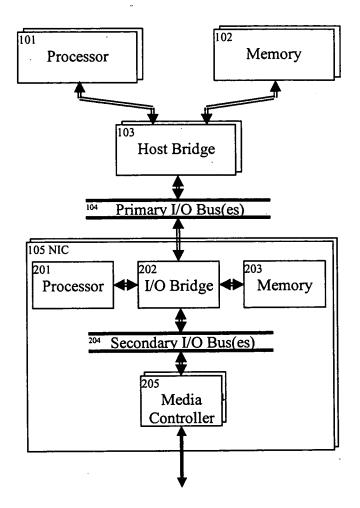


Figure 3 – Vito NIC Hardware Architecture

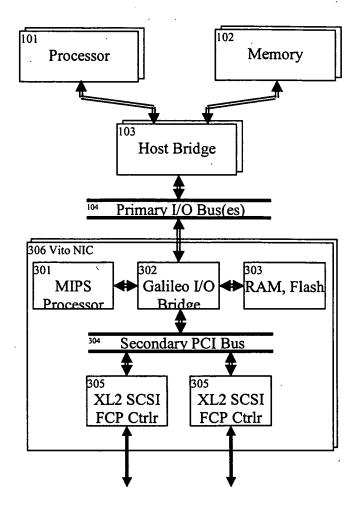


Figure 4 – Vito Software Architecture

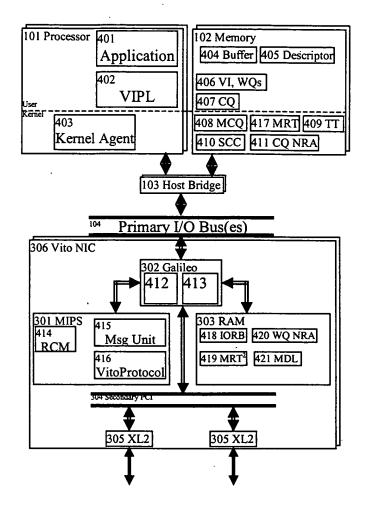


Figure 5 - Memory Registration Message Flows

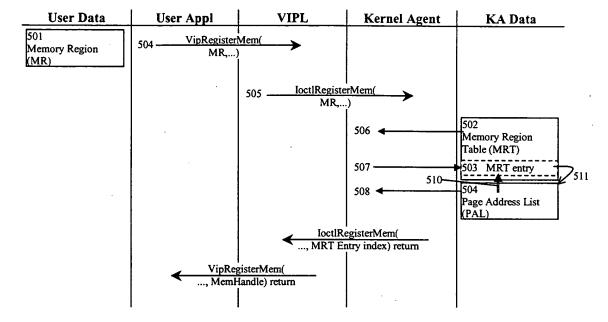


Figure 6 - Descriptor Posting Message Flows

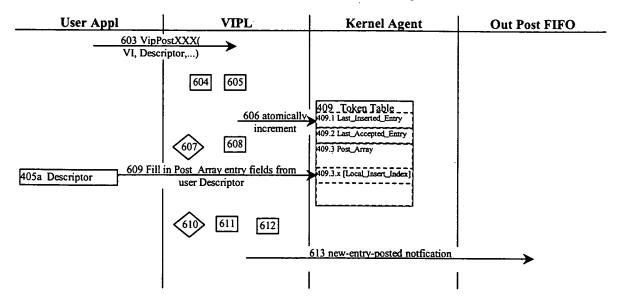


Figure 7 - Msg Unit Descriptor Processing Message Flows

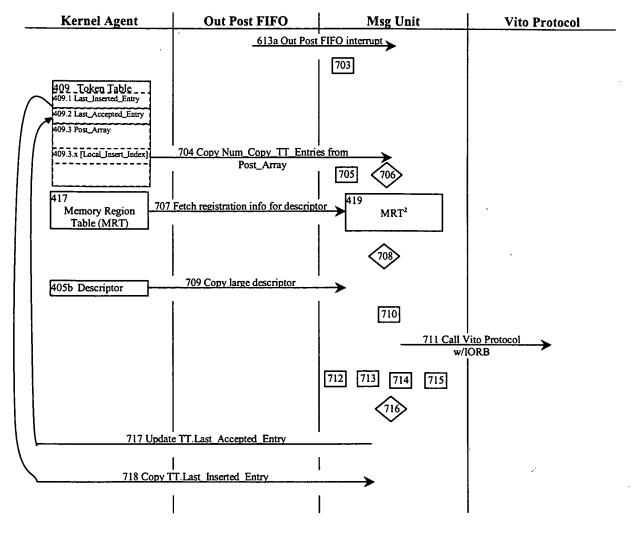


Figure 8 - Send Processing Message Flows

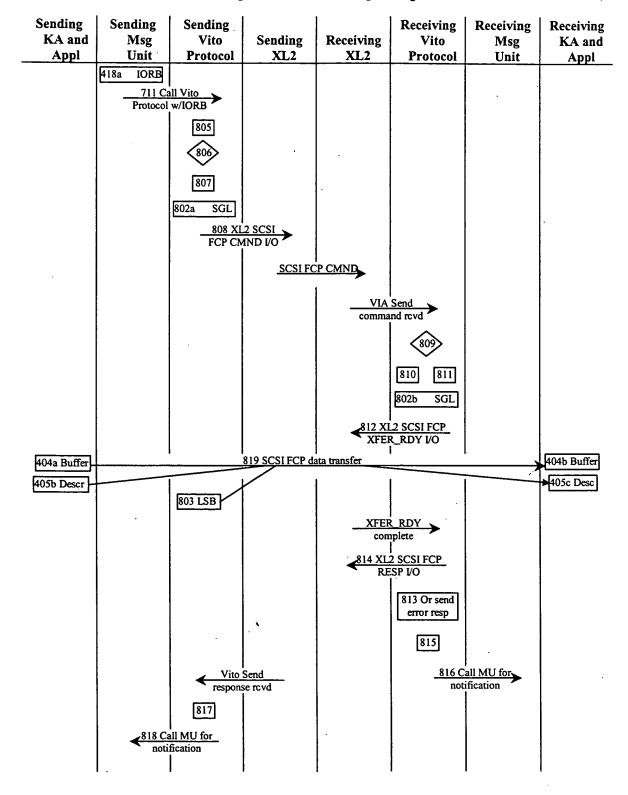


Figure 9 - RDMA-Write Processing Message Flows

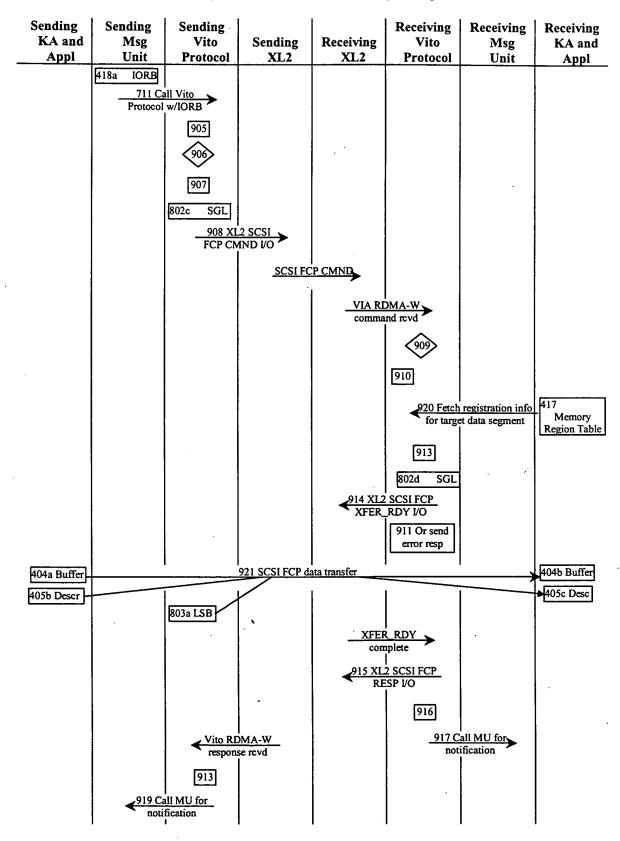


Figure 10 - RDMA-Read Processing Message Flows

Sending KA and Appl	Sending Msg Unit	Initiating Vito Protocol	Sending XL2	Receiving XL2	Responding Vito Protocol	Receiving Msg Unit	Receiving KA and Appl
	418a IORB  711 Ca	all Vito w/IORB					
		1002		·			
		1004					
		802e SGL 1005 X FCP CN	L2 SCSI IND I/O				
		101 61		CP CMND			
				VIA R	DMA-R and rovd		
					1006		
						tch registration or source data	417 Memory
		:			1011	2	Region Table
					802f SGL XL2 SCSI RESP I/O		
404a Buffer	<b>K</b>		1013 SCSI FO	P data transfer	· · · · · · · · · · · · · · · · · · ·		404b Buffer
	₹1015 C noti	Vito RI respons	OMA-R se rovd				

Figure 11 - Work Queue Completion Notification Message Flows

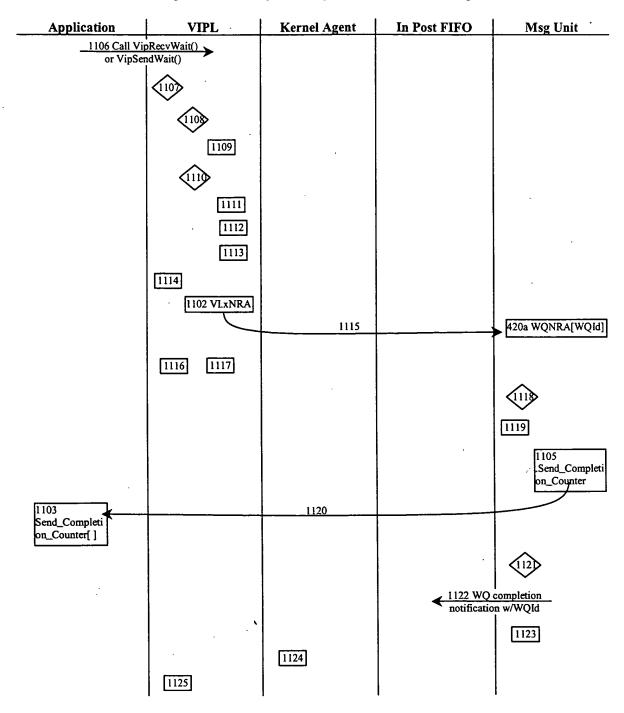
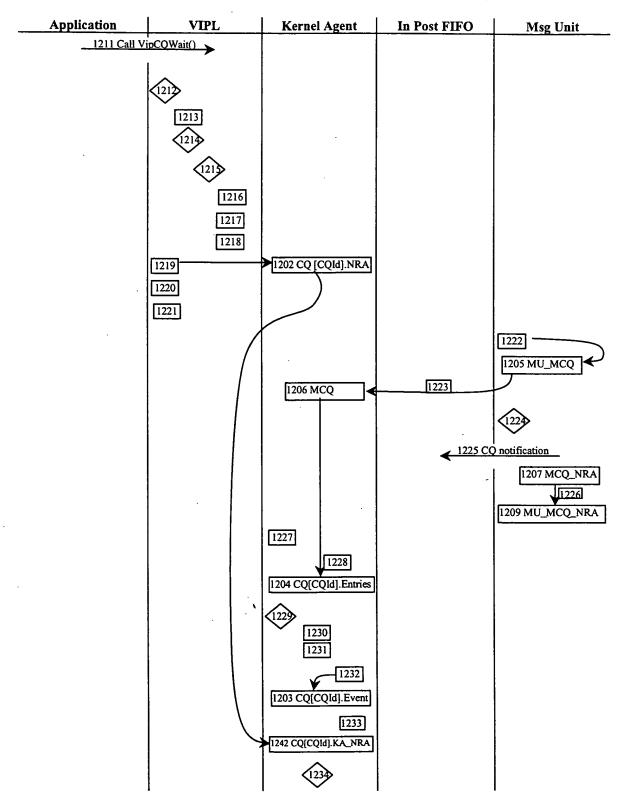


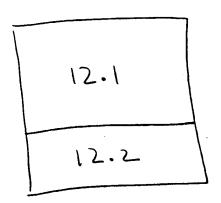
Fig. 12.1

Figure 12 - Completion Queue Completion Notification Message Flows



Application	VIPL	Kernel Agent	In Post FIFO	Msg Unit
		1208 KA_MCA_NRA		
		1236		
		1237		
	1238			
	1239			
	1240	·		
	1241			

Fig. 12.2



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Figure 13 – Memory Deregistration Message Flows

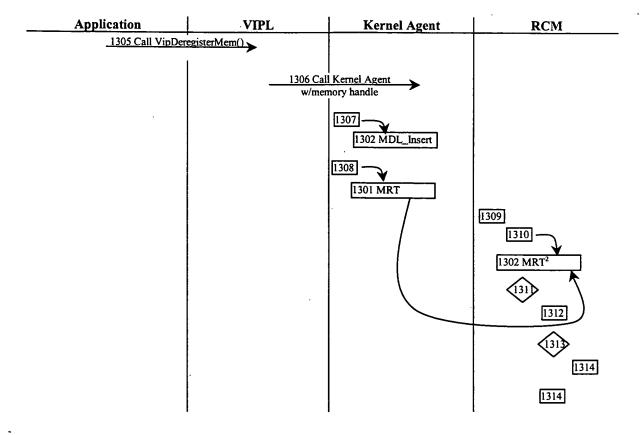


Figure 14 – Vito-FC FCP\_CMD IU Updates

SCSI Fibre Channel Protocol FCP_CMD Information Unit						Vito	over SCSI Fibre Ch	annel Proto	col FCP_CMD in	formation Unit		
	Word	Byte 0	Byte 1	Byte 2 Byte 3		Word	Byte 0	Byte 0 Byte 1		Byte 3		
FCP_LUN	0	First Le	wel LUN	Second L	Level LUN	o	VI Number Remote VI F		'I Number			
PGP_LUN	1	Third Level LUN		Fourth Level LUN		1	Reserved					
FCP_CNTL	2	Cmd Ref Num	Task Codes	Task Mgmt Flags	Exec Mgmt Codes	2	VI Control Segme	ent Flags	VI Operation Type	FCP R/W bits		
	3	1st Byte of CDB		,		3		Res	erved			
	4					4	RDMA Remote Memory Handle					
FCP_CDB	5				·	5	Upper	Upper RDMA Remote Memory Virtual Address				
	6				16th Byte of CDB	6	Lower	RDMA Remote	Memory Virtual Addre	ss		
FCP_DL	7		Data	Length		7	7 Cata Length					
Additional FCP_CDB	8-n	n Additional FCP_CDB 8-n Unused							used			

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Figure 15 – Vito-FC FCP\_RESP IU Updates

		SCSI	Fibre Channel P Information	rotocol FCP_RE on Unit	ESP		Vito ove		nannel Protocol nation Unit	FCP_RESP
	Word	Byte 0	Syte 1	Byte 2	Byte 3	Word	Byte 0	Byte 1	Byte 2	Byte 3
reserved	0					0				·
	1					1		•		
FCP_STATUS	2	reserved	reserved	Validity Flags	SCSI Status Byte	2	reserved	reserved	Validity Flags	SCSI Status Byte
FCP_RESID	3					3				
FCP_SNS_LE	N 4		(length of FCP_S	NS_INFO in bytes		4	(0=Good FCP_RESP and 8=Bad FCP_RESP)			
FCP_RSP_LE	N 5		(0,4, or 8 by	tes per FCP)		5	(0:	Good FCP_RESP	and 8=Bad FCP_RES	SP)
FCP_RSP_INF	6	reserved	reserved	reserved	RSP_CODE	6	reserved	reserved	reserved	RSP_CODE
. 0. 1/0. 1	7	reserved	reserved	reserved	reserved	7	reserved	reserved	reserved	reserved
FCP_SNS_INF	<sup>©</sup> 8-n	(Vari	able length as define	d by the FCP_SNS_	(LEN)	<b>8</b> -n		VI Star	us Code	

Fig. 16

IN	Post	-4128
OUT	Post	413 <sub>6</sub>

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Figure 17

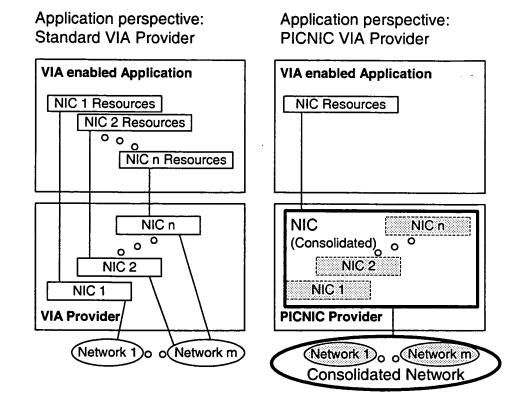
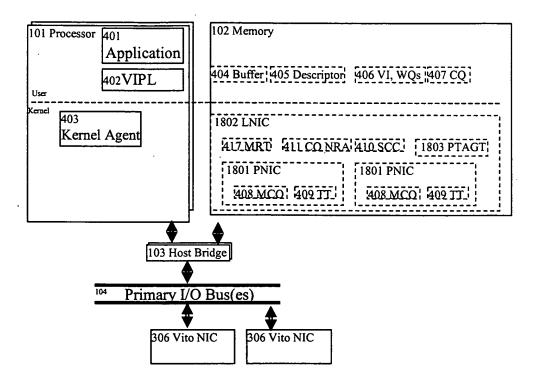


Figure 18 – PICNIC Data Structures



Host z01a NIC z02a NIC z02b NIC z02c Port z03e Port Port z03c z03d Port Port Port z03a z03b z03c Port z03f Host Port Host z01c Port z01b<sub>NIC</sub> z03g z02d Port z03h Port z02e z03j z06a// z06b Switch Switch z07b z07a Host Port z03k NIC z01d Port z02f z03l Host Port z01e<sub>NIC</sub> z03m z05a z06d z02g Port z03n

Figure 19 – Possible Link Configurations

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Figure 20 – Example Paths

Host		z01a			-			z01b		z01c		z01d	_	z01e	
	Port	z03a	z03b	z03c	z03d	z03e	z03f	z03g	z03h	z03i	z03j	z03k	z031	z03m	z03n
z01a	z03a	Lb						z04a							
	z03b		Lb						z04b						
	z03c			Lb	z06a;									z06a;	z06a;
					z07a;									z07a;	z07a;
					z07b;									z06c	z07b;
!					z06b										z06d
	z03d			z06b;	Lb									z06b;	z06b;
<u> </u>				z07b;						Į.				z07b;	z07b;
			 	z07a;										z07a;	z06d
		1		z06a						İ				z06c	
	z03e					Lb				z05a		z05a			
	z03f						Lb				z05b		z05b		
z01b	z03g	z04a					-	Lb							
	z03h		z04b						Lb						
z01c	z03i					z05a				Lb					
	z03j						z05b				Lb				
z01d	z03k					z05a						Lb			
	z031						z05b				-		Lb		
z01e	z03m			z06c;	z06c;					i				Lb	z06c;
				z07a;	z07a;										z07a;
				z06a	z07b;						1				z07b;
					z06b					ļ		1			z06d
	z03n			z06d;	z06d;			1						z06d;	Lb
1		i		z07b;	z07b;		1		1			ļ		z07b;	
				z07a;	z06b									z07a;	
			<u> </u>	z06a		<u> </u>				<u> </u>	<u> </u>	<u></u>	<u> </u>	z06c	<u> </u>